

New taxa and notes on *Banksia* L.f. (Proteaceae)

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Abstract

George, A.S. New taxa and notes on *Banksia* L.f. (Proteaceae). Nuytsia 6(3): 309-317 (1988). Several corrections of bibliographic data and orthography are given. New taxa described are *Banksia* series *Bauerinae*, *Banksia epica*, *B. oligantha*, *B. leptophylla* var. *melletica* and *B. spinulosa* var. *neoanglica*. A presumed natural hybrid in Western Australia is reported. Three further early names in *Banksia* are listed: none affects the accepted nomenclature. *Banksia plagiocarpa* has been rediscovered on the Queensland mainland.

Since the publication of my revision of the genus *Banksia* (George 1981) a number of developments have occurred to warrant a supplementary paper. The most remarkable is the discovery in 1984 of a new species of subgenus *Isostylis* R. Br. which previously contained only two species.

Several points of nomenclature and bibliography should be noted. First, the date of publication of Linnaeus' "Supplementum plantarum", in which *Banksia* was described, was April 1782, not October 1781 as given in my revision (Manitz 1976). The date of publication of the four species named by the younger Linnaeus (*B. serrata*, *B. integrifolia*, *B. ericifolia* and *B. dentata*) should be corrected also to 1782.

In accordance with a change adopted at the XIII International Botanical Congress in Sydney in August 1981, the specific epithet suffix *-eranus/a/um* should be *-erianus/a/um* (International Code of Botanical Nomenclature [Sydney Code], Art. 73, Rec. 73c(d), p.65). The *Banksias* that should be altered are *Banksia elderiana* F. Muell. & Tate and *B. hookeriana* Meissner.

Banksia littoralis R. Br. Var. *seminuda* A.S. George has been raised to specific rank by B.L. Rye (Nuytsia 5: 25, 1984), a change with which I agree.

A new series for *Banksia baueri* R. Br

In my revision (George 1981, pp. 312-313, 319) I considered *Banksia baueri* anomalous in the series *Quercinae* Meissner. I now believe that its distinguishing characters are sufficient for it to be placed in its own series, making a third monotypic series in *Banksia*. The awned perianth, unusual in the genus, tends to distract attention from the other characters of *B. baueri* that distinguish the species from the *Quercinae*. These are the ribbed pollen-presenter with a stigmatic groove, the acropetal floral development, the tomentose new vegetative shoots, the follicles that are beaked at the styler point after dehiscence, and the seeds with a notched wing.

***Banksia* subg. *Banksia* sect. *Banksia* ser. *Bauerinae* A.S. George, series nova.**

Frutices sine lignotuberis. Folia serrata, primo tomentosa. Inflorescentiae in ramulis lateralibus brevibus, raro terminales, late cylindricae. Perianthium limbo aristato. Pistillum infra apicem geniculatum; pollinis praebitor 2-4 mm longus, costatus, stigmatibus canaliculatis. Folliculi post dehiscenciam cum rostro laterali. Semina ala lateraliter lobata. Cotyledones obovatae, parum crenulatae.

Typus: Banksia baueri R. Br.

In the systematic sequence in my revision the species may retain its position between series *Quercinae* s. str. and series *Orthostylis* (Benth.) A.S. George.

Banksia epica A.S. George, sp. nov. (series *Cyrtostylis*) (Figure 1).

Affinis *B. praemorsae* Andrews et *B. mediae* R. Br., a quibus perianthio majore et praebitore pollinis longiore praecipue differt.

Folia obovata ad anguste cuneata, 15–50 mm longa, marginibus planis vel leviter recurvis, breviter serratis. Perianthium 40–44 mm longum limbum 4.5–5.5 mm longum includens, infra glabrum, supra extus pubescens limbo glabro. Pistillum 39–49 mm longum, glabrum; praebitor pollinis 1.5–1.8 mm longus. Folliculi ubi exserti 13–20 mm longi, 7–10 mm alti, 6–9 mm lati, colliculati, parce hirsuti; flores veteres persistentes, stylibus curvatis.

Typus. Point Culver, Great Australian Bight, Western Australia, c. 32° 55' S, 124° 42' E, 6 May 1986, J. Falconer s.n. (holo: PERTH; iso: CANB, MEL).

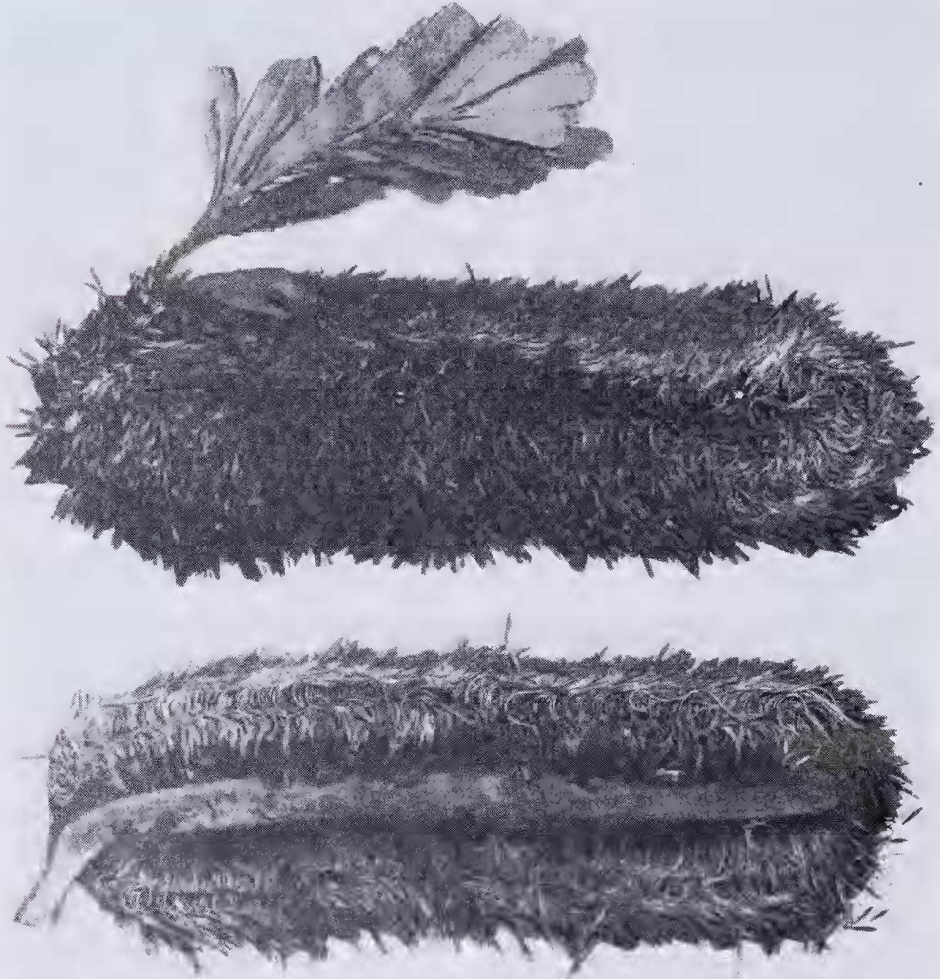


Figure 1. *Banksia epica* A. S. George—holotype. Bar scale is 5 cm.

Mature plant a *shrub* to 2 m, without lignotuber, much-branched and spreading. *Bark* not seen. *Branchlets* terete, closely hoary with fine grey curled hairs. *Leaves* obovate to narrowly cuneate, truncate, with an obtuse caducous mucro, 15–50 mm long including petiole of 2–8 mm, 6–15 mm wide; margins flat or very slightly recurved, shortly and obtusely serrate, sometimes almost entire; teeth to 1 mm long; upper surface ferruginous-tomentose becoming scurfy with short curled hairs; lower surface reticulate between main lateral nerves, the lacunae woolly; petiole closely hoary; new growth not seen. *Inflorescences* on short lateral branchlets from older branches; axis 9–17 cm long, 10–12 mm wide, 28–30 mm wide with common bracts, without flowers for 1–2 cm at base and often at apex. *Involucral bracts* not seen, fallen by mid-bud stage. *Common bracts* linear, 10–11 mm long, closely hirsute with pale brown hairs; exerted apex narrowly conical c. 1.8 mm long, acute, straight to slightly upturned, slightly scurfy at base, glabrous above, green. *Floral bracts* similar but narrower, 1.5 mm long and exerted apex smaller. *Flowers* pale yellow throughout, the limb slightly deeper; style cream; apex of pollen presenter purple. *Perianth* 40–44 mm long including limb of 4.5–5.5 mm, straight, relaxed after anthesis; claws filiform, 0.4 mm wide, appressed-pubescent in upper half, glabrous in lower half and inside; limb narrowly elliptic to linear, glabrous. *Anthers* 2.5 mm long on filament c. 0.7 mm long, apiculate. *Hypogynous scales* oblong, obtuse, 1 mm long. *Pistil* 39–43 mm long, gently curved, slender, glabrous except a few short hairs on ovary; pollen presenter linear-terete, 1.5–1.8 mm long, obscurely ribbed, slightly swollen at base; stigmatic groove oblique on upper side of apex. *Infructescence* stout, the old perianths and styles persistent and moderately curled. *Follicles* up to 50, largely concealed by old flowers for several years, in plan view elliptic, 13–20 mm long, 7–10 mm high, 6–9 mm wide; valves semi-elliptic, convex, shallowly colliculate, shining, very sparsely hairy but soon glabrous, pale brown; suture fine; opening probably mostly with fire, split from styler point leaving a broad beak; lips 1.5 mm wide. *Seed* obovate, 22–24 mm long; seed body obovate, 11–13 mm long, 7–8 mm wide, obtuse at base; inner face gently convex, with scattered small ridges, black, glistening; outer face almost flat, with sparse small ridges, ± shining; wing 13–16 mm wide, notched. *Separator* shallowly ridged above seed body.

Other specimens examined. WESTERN AUSTRALIA: Toolinna, S of Caiguna, Great Australian Bight, 22 Oct. 1973, *E. C. Nelson* ANU 17168 (CANB); type locality, 9 Jan. 1986, *J. & L. Falconer* (PERTH); type locality, *G. J. Keighery* (fruit) (PERTH).

Distribution. Known from two localities in the western coast of the Great Australian Bight, Western Australia (Map 1).

Habitat. Grows in deep white sand in heath, atop the coastal limestone cliffs.

Flowering period. April to June.

Conservation status. Rare—code 2RC (Leigh et al. 1981). The localities lie within the Nuytsland Wildlife Sanctuary.

Banksia epica is clearly related to *B. praemorsa* Andrews and *B. media* R. Br., differing from both in the larger perianth (33–34 mm long in *praemorsa*, 32–38 mm in *media*) and the longer pollen presenter (1 mm in *praemorsa*, 0.75 mm in *media*). From *B. praemorsa* it differs further in the indumentum of the perianth (glabrous in *praemorsa*).

From *B. media* it is also distinguished by the small almost flat leaves and the longer, glabrous apex of the common bracts. Plants of *B. media* that occur at Point Culver have narrow leaves 11–12 cm long.

The species is known from Point Culver and Toolinna Rockhole. At the former a large population occurs together with *Banksia media* and *B. speciosa*, while at Toolinna it is the only *Banksia* present. This is the eastern most record of the genus in Western Australia, in 124° 59' E, and may be the locality mentioned by the explorer Edward John Eyre. In the journal of his expedition from Adelaide to Albany—the first such crossing by land—he described sighting *Banksias* on 1 May 1841, an indication that he was well on the way to his destination. Eyre gather no specimens, the first collection being one in old flower by E. Charles Nelson in 1973 but unavailable when my revision was prepared.

When the Banksia Atlas (a joint project of the Australian Biological Resources Study and the Western Australian Department of Conservation and Land Management) began in 1984, a request was made for participants to collect good specimens. John and Lalage Falconer of Esperance, Western Australia, made two trips in 1985 and 1986. John eventually was able to collect flowering material after a solo expedition from Warburton (where they were then stationed) across the Great Victoria Desert and Nullarbor Plain. It is in recognition of Eyre's epic journey of 1841 and the Falconers' efforts to collect specimens that the new species is named *epica*.

Banksia oligantha, A. S. George, sp. nov. (subgenus *Isostylis*) (Figure 2).

Species inter *B. ilicifoliam* R. Br. et *B. cuneatam* A. S. George intermedia, sed ab illa foliis et floribus minoribus, ab hac foliis nitentibus concavioribus et floribus parum minoribus, et ab ambabus inflorescentia pauciflora, differt. Foliarum lamina 1.5–3.7 cm longa; perianthium 21–23 mm longum; inflorescentia 20–35-flora.



Figure 2. *Banksia oligantha* A. S. George—holotype.

Typus: Nature Reserve 9098, 28 km NW of Wagin, Western Australia, 33° 10' S, 117° 04' E, 18 Nov. 1984, A. Taylor s.n. (holo: PERTH; iso: CANB, K, NSW).

A shrub to 3 m high, with 1 or few main stems, apparently without lignotuber. Bark smooth becoming lightly fissured on lower part of trunk, grey. Branchlets hirsute and closely pubescent, becoming glabrous, pale orange-brown or yellow, becoming grey. Leaves scattered, obovate to angular-obovate, obtuse but mucronate, very concave, deep green and shining above, paler below with many pits; margins not recurved, with usually 2-4 mucronate teeth c. 1 mm long; lamina 1.5-3.7 cm long, 4-20 mm wide when flattened; petiole 2-3 mm long. Inflorescences terminal, numerous, 20-35-flowered, 2.5-3 cm wide at anthesis. Inflorescence bracts linear but thick and densely tomentose in lower half, acute and appressed-pubescent at apex, 2-4 mm long. Common and floral bracts 4 mm long, narrowly linear, acute, densely white-villous, the apical hairs straighter and brown. Perianth 21-23 mm long including limb of 3-3.5 mm, red in lower half grading to cream above, the limb pale yellow, all turning orange-brown: claws somewhat broadened above glabrous base, then narrowed towards limb, appressed-pubescent outside, glabrous inside; limb glabrous. Hypogynous scales oblong but narrowed towards obtuse apex, 2 mm long. Pistil 19-24 mm long, thickened above ovary than tapering, glabrous; pollen-presenter c. 1 mm long, slightly thickened. Old flowers caducous. Follicles 1-6, \pm ovoid, somewhat curved, 14-19 mm long, 10-15 mm high, 8-9 mm wide; valves smooth, closely tomentose, pale grey with dark mottling, remaining closed or sometimes opening spontaneously, beaked at stylar point; lips c. 1 mm wide, wider at base. Seed body \pm cuneate, 4 mm long and wide, irregularly wrinkled and grey-brown on outer face, with a few short ridges and black on inner face; wing transversely semi-elliptic to ovate, not notched, 5-6 mm high, 13-16 mm wide, wrinkled, pale brown grading to almost black along lower margin.

Other specimens examined. WESTERN AUSTRALIA: type locality, Sept. 1984, K. Wallace (in fruit) (PERTH); type locality, S. D. Hopper 4071 (in fruit and young bud) (PERTH).

Distribution. Known only from the type locality where there are about 300 plants (Map 1).

Habitat. Grows in brown and yellow-brown sand in tall shrubland, with *Banksia attenuata*, *B. prionotes*, *Eremaea pauciflora*, *Leptospermum erubescens*, *Conospermum*, etc.

Flowering period. October-November.

Conservation status. Endangered—code 1EC (Leigh et al. 1981).

This species was discovered in September 1984 by Mr Ken Wallace, Department of Conservation and Land Management, while surveying a nature reserve. It belongs to subgenus *Isostylis*, which previously contained two known species, and although closely related to these is distinct in the low number of flowers in the inflorescence. It is for this feature that the species is named.

The new species occurs in a population of about 300 plants. They appear to have no lignotuber, i.e. are fire-sensitive. The habit is similar to that of *B. cuneata* A. S. George, but otherwise the species has the aspect of *B. ilicifolia* but is smaller in all respects.

The discovery of these two species brings the total in the genus to 75.

***Banksia leptophylla* A. S. George**

Having now re-examined this species in the field, in particular the typical, summer-flowering variant, I now consider it would be useful to name formally the small winter-flowering variant. In their typical forms these variants can be separated morphologically on size of flowers and inflorescence. They occupy different geographical ranges and flower at different seasons. It must be noted, however, that forms intermediate in size and flowering time occur.



Map 1. Distribution of *Banksia oligantha* (▲), *B. epica* (●), *B. leptophylla* var. *melletica* (◆) and *B. spinulosa* var. *neoanglica* (▼).

Banksia leptophylla* A.S. George var. *leptophylla

Perianth 42–47 mm long. Pistil 56–62 mm long. Flowers mainly in summer.

Distribution. Occurs between Tathra National Park and Mogumber, Western Australia (Map 1).

Habitat. On sandy rises in shrubland.

Flowering period. Summer to autumn.

***Banksia leptophylla* var. *melletica* A.S. George, var. nov.**

Ab *Banksia leptophylla* var. *leptophylla* floribus minoribus (perianthis 30–36 mm longo, pistillo 34–44 mm longo), hieme florentibus, differt.

Typus: c. 13 km N of Gingin turnoff, Perth–Lancelin road, Western Australia, 10 June 1966, A. S. George 7761 (holo: PERTH; iso: CANB, K, MEL, NSW).

Distribution. Occurs between the lower Murchison River and Guilderton, Western Australia, mostly within 30 km of the coast (Map 1).

Habitat. In deep sand, in sand over limestone and in depressions (not permanently damp), in shrubland. Often locally common.

Flowering period. Winter.

Conservation status. Not rare. The variety occurs in several conservation reserves and regenerates vigorously from seed after fire.

The varietal epithet is derived from the Greek verb *mello* (to intend to do, only think of doing), in reference to the long period of deliberation over the status of the taxon.

***Banksia spinulosa* Smith var. *neoanglica* A.S. George, var. nov.**

Ab *Banksia spinulosa* var. *cunninghamii* (Sieber ex Reichb.) A. S. George caulorhiza lignotuberosa, ramulis pluribus ad 2m altis, praecipue differt.

Typus: 1 km N of turnoff to New England National Park, Ebor–Armidale road, New South Wales, c. 30° 28' S 152° 17' E, 6 April 1986, S. C. Clemesha (holo: NSW; iso: CANB, BRI, MEL, PERTH).

Rootstock lignotuberosus. Leaves broadly linear; margins recurved, entire to serrate; nerves obscure on upper surface, hidden on lower by close tomentum that is pale brown becoming white. Perianth golden. Pistil usually black. Follicles usually remaining closed.

Other specimens examined. NEW SOUTH WALES: Lookout Point, Gibraltar Ra., NE of Glen Innes, 24 April 1956, E. F. Constable NSW 37323 (NSW); Mt Warning, 3 Oct. 1939, F. A. Rodway (NSW); track to Boonoo Boonoo Falls, NE of Tenterfield, 29 Nov. 1970, I. R. Telford 2549 (CBG). QUEENSLAND: NE of Wallangarra, 9 May 1970, M. Fagg 585 (CBG).

Distribution. New England Tableland, northern New South Wales, and the Macpherson Range, south-eastern Queensland.

Habitat. Usually in granitic or basaltic soil, in heath and woodland.

Flowering period. Late autumn and winter.

Conservation status. Not rare. The variety occurs within several conservation reserves.

In my 1981 revision I recognised three varieties within *Banksia spinulosa*. Experience in using this classification, especially by participants in the *Banksia Atlas*, has confirmed that these taxa are best retained within one species at the varietal level. The species itself is readily recognised, and usually the varieties also, but problems of identification arise with intermediates. *Banksia spinulosa* var. *cunninghamii* is characterised by the absence of a lignotuber and by indumentum and leaf characters (Nuytsia 3: 396–397). Recent observations and collections, especially by *Atlas* participants, have confirmed that populations previously included in var. *cunninghamii* in northern New South Wales and south-eastern Queensland are consistent in having a lignotuber. Although in vegetative and floral morphology they cannot be distinguished from var. *cunninghamii* it seems useful to formally recognise the taxon.

The varietal epithet refers to the New England Tableland, the centre of distribution.

The presence or absence of a lignotuber is reflected in the above-ground growth form of a plant. One with a lignotuber usually has several main stems whereas one without a lignotuber usually has a single stem and grows much taller (e.g. see George 1981, fig. 72, p. 392). In each case the above-ground parts are killed by fire, but the lignotuberosus form then sprouts from its rootstock while the other is killed and regenerates only from seed. Seedlings of lignotuberosus plants are rare in the wild, and in some taxa (e.g. *Banksia sphaerocarpa* R. Br.) the production of seed is low. When seedlings of lignotuberosus plants do survive they usually grow much less quickly than those of non-lignotuberosus plants. The evolution of the lignotuber in Australian plants is evidently a response to fire, but populations of such taxa appear stable in having little recruitment of new plants. Thus on the one hand they have developed a safeguard against fire, but on the other are at a disadvantage in competing for new space with non-lignotuberosus taxa.

Three other species of *Banksia* appear to show this divergence of habitat but require further study. They are *B. ashbyi* B.L. Burtt, *B. marginata* Cav. and *B. violacea* C. Gardner. The situation also exists in some species of the genus *Dryandra*, e.g. *D. armata* R. Br., *D. fraseri* R. Br.

Presumed natural hybrid

While recording *Banksias* for the *Banksia Atlas*, Mr G. Schmidt of Kalamunda, Western Australia, discovered a plant which appears to be a hybrid between *B. prionotes* Lindley and *B. lindleyana* Meissner. In most characters it is intermediate between these two, both of which were present with the presumed hybrid and which belong to closely-related series within the genus. The leaves, however, are similar to those of *B. prionotes*.

Spreading shrub 2.5 m tall. Leaves to 22 cm long, 13–15 mm wide; margins flat, shallowly lobed almost to base; lobes ± triangular, to 2 mm high, obtusely and shortly mucronate. Inflorescence 12–13 cm long. Perianth 37 mm long including limb of 8 mm; claws closely tomentose and shortly hirsute; limb minutely pubescent. Pistil 40–45 mm long, bowed, glabrous; pollen presenter c. 3.5 mm long, swollen at base, fusiform and ribbed above. Old flowers persistent on infructescence, the pistils wiry. Follicles elliptic in plan view, 12–13 mm long, 7–8 mm wide, 4 mm high, shortly beaked at stylar point, densely hirsute.

Specimen examined. 4.5 km N of double gate in State Barrier fence, N edge of Murchison House Stn, Western Australia, 27° 34' S, 114° 03' E, 8 Sept. 1985, G. Schmidt (PERTH).

A single plant of the presumed hybrid was sighted, and the description is based on two fruiting specimens, probably developed from the previous season's flowering. The persistent perianths and pistils have retained their morphology. Each inflorescence has produced a number of follicles that are fully grown but were probably not fully mature when collected.

Only two other presumed natural hybrids in *Banksia* in Western Australia have been reported, one between *B. hookeriana* Meissner and *B. prionotes* (Keighery 1985), the other between *B. hookeriana* and *B. menziesii* R.Br. (Dixon 1986). In contrast, natural hybrids appear to be frequent in eastern Australia.

Further names in *Banksia*

The following names were found by Mr Arthur D. Chapman while searching literature for entries for the Australian Plant Name Index. None affects the accepted nomenclature of *Banksia*.

Banksia lamberti Hort. ex Courtois, Magasin d'Horticulture, Suppl. 1: 295 (1833).
Type citation: none given.

No sheet bearing this name has been seen. From the description it appears that this may be synonymous with *B. spinulosa* Smith var. *cunninghamii* (Sieber ex Reichb.) A.S. George.

Banksia intermedia Sweet ex Courtois, Magasin d'Horticulture, Suppl. 1: 295 (1833); *Banksia intermedia* Sweet, Hort. Brit., 2nd edn, 2: 349 (1827), nomen nudum. *Type citation:* "in Nova Hollandia [Australia], introduced to Britain in 1824" (Sweet).

No sheet bearing this name has been seen. The description is of leaves only and is insufficient to allow definite application of the name. It is possibly a synonym of *B. oblongifolia* Cav.

Banksia longifolia var. *pubescens* (Willd.) Breiter, Hortus Breiterianus 282 (1817).

This is based on *Cochium pubescens* Willd. which is not a *Banksia* but probably a *Hakea*.

Distributional note

Banksia plagiocarpa A. S. George has been rediscovered on the Queensland mainland. Discovered in 1867 and re-collected in 1868 by John Dallachy on the Coast Range at Rockingham Bay, Qld, it was not collected again until 1981 when the type collection was gathered on Hinchinbrook Island. In 1983 Mr Ian R. Telford, of the Australian National Botanic Gardens, found the species on Bishop Peak in the Coast Range, opposite Hinchinbrook Island.

Acknowledgements

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References

- Courtois, R. (1833). Essai sur les espèces de *Banksia*. Magasin d' Horticulture, Supplement 1: 292-305.
- Dixon, I. R. (1986). First hybrid *Banksia* from Western Australia *Banksia hookeriana* x *B. menziesii* (dwarf form). Protea News 4: 35.
- George, A. S. (1981). The genus *Banksia* L. f. (Proteaceae). Nuytsia 3: 239-473.
- Keighery, G. (1985). An enigmatic *Banksia* population, Banksia Atlas Newsletter 3: 13.
- Leigh, J. H., Briggs, J. D., & Hartley, W. (1981). "Rare or Threatened Australian Plants". Australian National Parks & Wildlife Service Special Pub. 7.
- Manitz, H. (1976). Friedrich Ehrhardt und die publikation des "Supplementum Plantarum" von Linné filius. Taxon 25: 305-322.
- Rye, B. L. (1984). A new species and a new combination among the Proteaceae represented in the Perth Region. Nuytsia 5: 25-30.

